

**AFTER-DINNER TALK
FOR
LANSCE USERS GROUP**

**CRISES: BIG AND SMALL, PAST AND PRESENT
L. ROSEN
1/25/00**

I am pleased to have this opportunity to share with you my sense of the challenges we today face in the context of some past crises. As much as any other group at LANL, yours has a key role in determining the future of scientific collaboration at this Laboratory. And that future can be crucial to whether we remain a world-class Laboratory in the service of national security and international stability.

I have written my message in deference to brevity and precision. Precision is important. I will give an example. During the Presidency of Woodrow Wilson, in the midst of World War I, the Secretary of State unexpectedly died. Late that night, the President was awakened by a call from an acquaintance who, after expressing regret at the demise of the Secretary, said to him, "Mr. President, I would like to take his place." The President replied that it was all right with him if the caller could work it out with the Good Lord.

These are not the best of times. For example, although we have deterred war among the great powers for the longest period in modern history, violent conflict is the norm in one-third of the world and dire poverty, in terms of the number of people afflicted, is growing, world population is burgeoning, as is the efficiency of weapons of destruction. Environmental concerns are growing. However, they also are not the worst of times. For example, we are not in the midst of really major wars nor do they appear to be on the horizon. Dictatorships are at an all-time low and democratic, political, social, and economic systems are at an all-time high. Life expectancy is increasing. All of the above, good and bad, are impacted by science and technology, by way of options, which will bring changes. Not all of them will be to our liking. More and more will we be called upon to justify new science initiatives and even new technology developments. Perhaps nowhere will the demand for justification be more intense than in the national laboratories, especially those charged with maintaining our military superiority and technology as a defense and as a deterrent. But nobody has better reason for spending government funds than do you.

Budgets have not been increasing as rapidly as demands for justification of those budgets. It has always been so. I clearly recall the budgetary problems we, at Los Alamos, faced in the 1950s, 60s, and 70s; but never without lighter moments. Once, when the confrontation with Congressional

Staff became unreasonably acrimonious (what have you done for us lately?), I remember telling those assembled about the Yuppie couple who, despite their high income, could not make ends meet. They scheduled a dinner meeting to analyze the situation. He tried to convince his wife that their budget would balance if she learned how to cook, and they could dispense with the Chef. She replied that if he were a better lover they could dispense with the Chauffeur. The meeting adjourned, but we got our budget increase.

I thought that damage to our national security had reached a maximum for a single event when the Senate refused to ratify the Comprehensive Nuclear Test Ban Treaty. It seems to me that only the widening income gap between our most affluent and poorest population segments, world-wide, represents a greater danger to international stability. Of course this is debatable.

But what is not debatable is the havoc being visited upon the national labs by, what to me appears to be, a draconian reaction to the Wen Ho Lee Affair. Certainly, national security demands that we provide utmost protection to our most sensitive secrets. On that everyone agrees. But equally important to national security is that we maintain the capability to generate new secrets and to avoid technological surprise. Neither secrets nor technology have infinite lifetime. It is the above capabilities that are now being threatened by what Secretary Richardson characterizes as "Congressional Hysteria." I believe we face a major crisis. But there is time to limit the damage. Recent statements by Secretary Richardson, Senator Domenici, and Senator Bingaman make me hopeful.

Niels Bohr was a frequent visitor to Los Alamos during the war, when he was known as Nicholas Baker for security reasons. In his lectures, he would often opine how difficult it was to predict "especially the future," and then he would go on to predict the future. I will not try to predict the future, but I want to put the present crisis in perspective by reviewing some past crises at Los Alamos, big and small, serious and humorous.

In 1943 there was serious consideration of canceling the Manhattan Project. Emile Konapinsky and Edward Teller had brought to Oppenheimer's attention the theoretical possibility of igniting the atmosphere by detonating a nuclear explosion. Oppenheimer asked Bethe to calculate the safety factor. It turned out to be more than 20 orders of magnitude. The issue was revisited 10 years later by Gregory Breit, with similar conclusions. They have not been proven wrong.

During the war, General Groves complained to Oppenheimer about the enormous strain placed on hospital facilities by the baby boom. Oppenheimer replied that it was not his responsibility to try to limit child-bearing. Groves then suggested that lunch breaks be shortened.

A much more serious problem for the Lab was the discovery of a high spontaneous fission rate for plutonium. It made a gun device useless. The challenge was severe, but a solution was found.

Immediately after the war, most of the prominent senior scientists returned to their universities and laboratories to teach the next generation of scientists. And it is fortunate that they did so, but the Laboratory almost ceased to exist. It was in good part the intelligence reports about USSR progress on fission and fusion weapons that kept the Laboratory in the front ranks of science and technology institutions.

The next threat came from Senator Joseph McCarthy's efforts to rout out communists from every facet of national life, especially government. Many people were invited to appear before Boards for questioning. Few were found to have communist connections and fewer still were found to be security risks—none at Los Alamos. Later, Robert Oppenheimer's clearance was cancelled, but eventually he received a Presidential apology by way of the Fermi Award.

The most severe blow came when Klaus Fuchs was discovered to be a spy for the Soviet Union. He was part of the British Mission and not subject to clearance by U.S. Agencies. If any single event could be said to be capable of altering the world-wide strategic balance of power, the Fuchs betrayal should rank as number one, but it had no such impact. President Truman wisely refused to permit "hysteria" to triumph over reality. He refused to shackle the nuclear weapons laboratories in the name of heightened security. We now know that he was absolutely right. For us to have emulated the USSR in the isolation of scientists and engineers at the weapons laboratories would have harmed us more severely than it did the Soviet Union because our political system does not permit involuntary servitude for anyone except prisoners.

A mini-crisis for Los Alamos came in the guise of "The year of the Oath"! The University of California Board of Regents decreed that all U of C employees must sign a sworn statement as to their loyalty to the U.S. and its form of government. Most people objected, on principal, but almost everyone signed the oath and the issue was forgotten. A notable exception was Pief Panofsky who resigned his faculty position at Berkeley, moved to Stanford University, built SLAC, and became a valued government consultant on defense issues.

Still another mini-crisis occurred when President Nixon, without consulting the scientific community, declared war on cancer. Budgets were to be shuffled to reflect this priority. The very next day I was scheduled to brief the NCI National Cancer Board on the issue of Pi-meson therapy. The Chairman of the Board asked whether anyone could tell him what cancer is. The atmosphere was somber until the Chairman told the following story. A group of elderly widows were in the habit of

gathering monthly to discuss common problems. At one such gathering, one of them volunteered that she got syphilis at 82. Another replied, "Well, I got IBM at 94." I was then asked to speak, after which they agreed to join AEC in funding the biomedical facility at LAMPF and the Cancer Center at UNM. The latter still operates, has greatly expanded, and is a boon to the entire region. It is not unusual for science to bring its benefits in unpredictable ways. The history of LAMPF reads like "The Perils of Pauline." By the late 1950s, LANL had developed a fission bomb, a fusion bomb—and miniaturized both. The Cold War was raging. It was necessary to assure the vigor of LANL and of nuclear physics. LANL opted for a meson factory. It was the summer of 1967. The House Budget Committee asked Norris Bradbury for assurance that LAMPF would not go over budget. He replied that, if it did, they could use his blood in the cooling system. We did not go over budget.

In September 1967 Mary and I were passengers in a car which was demolished by an out-of-control sports car. In October Congress authorized construction of LAMPF and appropriated 2.5 million dollars. In December we held an in-door ground breaking. Many big wheels from Congress, the AEC, and the military were in attendance. I was still on crutches, but Norris wanted me to give the main address. He was not keen on us complaining about the budget. So I told the story about the senior diplomat's wife who complained that she didn't have proper clothes, especially shoes. Her husband magnanimously provided shoe money. At the next formal affair she appeared in her new shoes and nothing else. I concluded with thanks to Congress for shoe money. Later Senator Anderson told me what a great story that was.

But now we have the specter of severely limiting access to foreign nationals at LANL, even though aside from Fuchs, no non-U.S. citizen has ever been found in violation of our security laws. In addition there are new regulations limiting communications between national lab scientists and the world scientific community; and also polygraph testing appears to be in the offing. I believe the latter requirement will fade away, because it will too severely limit attracting the expertise required to deal with nuclear weapon design issues. Weeding out counter-productive restrictions on communication in non-classified areas may have a longer relaxation time, but I am confident it will be done.

About 15 years ago Mary and I were invited to visit the Peoples Republic of China. They offered to take us wherever we wished to go in exchange for three lectures, one of which should be on energy.

In the energy lecture I expressed my view that nuclear energy was absolutely essential if we are to avoid disasters due to environmental pollution and climate change and if we are to avoid international instability due to energy and water shortages. At the question and answer period there

was no disagreement with my major thesis, but I was asked how China can persist in building nuclear reactors as long as there was the threat of war with the Soviet Union. My answer was to build them underground. Well, it appears that the pro-nuclear faction won out. They are building reactors, but not underground.

Near the end of our visit, a messenger from Vice Premier Fang Yi appeared and invited us to visit with the Vice Premier. A car was waiting for us. It was a marvelous visit. Half was devoted to him telling us how China had solved its food, housing, clothing, and unemployment problems. The rest of the time, he listened to my assessment of the institutes I had visited. And then came the real purpose of the meeting and perhaps of our visit to China. Fang Yi said he was a round peg in a square hole because he was responsible for science, technology, and education in all of China, yet he had not even a high school education. He remarked that his job requires he lay the groundwork for catching up with the West in science and technology as soon as possible. Then he challenged me to tell him what I would do if I were in his position. I replied that I would each year identify hundreds of the most promising scientists and engineers and send them to Centers of Excellence around the world, not for one or two weeks but for one or two years. His response was, "A splendid idea Professor Rosen, would you accept some of these at your laboratory."

I reminded him that there was a twenty-one-day limit on visits by PRC nationals, but if he would nominate people whom we know because of their scientific reputation, I would try to get the rule changed. He did, and I did, through the good offices of Herman Roser who was then Director of the Division of Military Applications. Roser agreed with the premise that we must have a working relationship with the most populous country in the world and that this could be encouraged in non-sensitive areas as we were doing with USSR scientists, and without risk to our security. I can only hope that this major step forward will not be sacrificed to placate those who have not made the effort to understand precisely how science and technology enhances our military, economic, health, and environmental security and how it has become an international endeavor.

A few months ago, I was favored by a visit from the FBI. He was polite and bright and wanted to know what, if anything, I knew about the Wen Ho Lee situation. I could only explain how I believe this affair is hurting LANL's productivity now and its future capability to carry out its missions. I told him about my many trips to the former Soviet Union and also to China and mentioned that on none of these trips did anyone ever try to elicit confidential or classified information and that, as far as I know, all of the colleagues with whom I traveled had the same non-experience. My FBI visitor seemed surprised.

Secretary Richardson is not alone in recognizing the dangers of isolating the staffs of the national Laboratories from the rest of the scientific world. The major scientific societies, the National Academy of Science, many prominent scientists and the LANL Fellows have spoken out vigorously on the issue. The Fellows White Paper can be downloaded from the internet under www.Fellows.lanl.gov. This paper details the good that has come in the past from our interactions with foreign-born scientists and the harm that will come in the future from truncating such interactions. The paper says, "We conclude that foreign national participation is vital in open areas of the Laboratory to maintain the intellectual capacity to perform the Laboratory mission. We also conclude that scientific exchange in the international community that includes sensitive countries is vital to the well-being of the Laboratory and to our ability to execute our immediate and long-term missions." The paper then goes on to quote Senator Pete Domenici, Senator Jeff Bingaman, DOE Secretary Bill Richardson, and the National Academy of Science whose statements are in full accord with the LANL Fellows' conclusions.

So where do you fit into this picture? I see the opportunities as follows.

The LANSCE User Group is a key element (one of the most important elements) in maintaining LANL as a world crossroads for science and technology. The interdisciplinary and almost unique capabilities of LANSCE now, and projected for the future, make it a national treasure for SBSS but also for many important applications which impact national security in its broadest terms, military, economic, and health. But perhaps even more important than the above might be that your involvement enables international confidence-building through scientific collaborations across disciplines and across national boundaries. It is for these reasons that I salute you and wish you every good fortune in your endeavors

Thank you for listening.